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10/693,240	10/24/2003	David W. Abraham	YOR920030477US1	1429

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EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/693,240	ABRAHAM, DAVID W.
	Examiner	Art Unit
	David Schindler	2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/24/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the laser of claims 10, 11, 17, and 18 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 8, 15, 18, and 20 are objected to because of the following informalities:

As to Claim 8,

The phrase "(Gd,Tb,Dy)-(Fe,Co)" on line 1 is unclear as it is not clear which of these features is required. It is instead recommended to use such phrases as "Gd-Fe" and "Tb-Fe."

As to Claim 15,

The relationship between the "heat-conducting material" on line 2 of Claim 15 and the "magnetic coating" on line 2 of claim 14 is unclear.

As to Claims 18 and 20,

The phrase "a cantilever adapted for oscillating" on line 2 does not positively recite the claim and it is recommended to instead use the phrase "a cantilever that oscillates."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. (6,101,164) Embodiment One (KE1) in view of Kado et al. (6,101,164) Embodiment Two (KE2).

As to Claim 1,

KE1 discloses providing a probe (80) including a material (99) having temperature-dependent magnetic properties (Column 22, Lines 49-55), the probe having a tip adapted for observing a surface of a sample ((Column 21, Lines 60-62) and (Column 22, Lines 6-8)).

KE1 does not explicitly disclose heating a probe including a material having temperature-dependent magnetic properties.

KE2 discloses heating a probe with a laser (Column 17, Lines 62-64)

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include heating a probe including a material having temperature-dependent magnetic properties given the above disclosure and teaching of KE2 in order to extend the life of the probe (Column 6, Lines 31-36).

As to Claim 2,

KE1 discloses the probe tip is tapered (Figure 12).

As to Claim 3,

KE1 does not explicitly disclose heating the probe using a time-varying heat source.

KE2 discloses heating the probe using a time-varying heat source (Laser) (Column 17, Lines 60-62).

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include heating the probe using a time-varying heat source as taught by KE2 in order to use a laser to heat the probe.

As to Claim 4,

KE1 discloses the probe is coated with the material having temperature-dependent magnetic properties (Column 22, Lines 49-52).

As to Claim 5,

KE1 discloses the probe includes a ferromagnetic material (Column 22, Lines 49-52).

As to Claim 7,

KE1 discloses the use of a ferrimagnetic material (Dy-Fe) (Column 23, Lines 27-30).

KE1 does not explicitly disclose the probe includes a ferrimagnetic material.

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include the probe includes a ferrimagnetic material given the above disclosure in order to secure stable operation for a long time (Column 23, Lines 30-32).

As to Claim 8,

KE1 discloses the use of a ferrimagnetic material (Dy-Fe) (Column 23, Lines 27-30).

KE1 does not explicitly disclose the probe includes a (Gd,Tb,Dy)-(Fe,Co) alloy.

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include the probe includes a Dy-Fe alloy given the above disclosure in order to secure stable operation for a long time (Column 23, Lines 30-32).

As to Claim 10,

KE1 discloses a tapered probe tip (Figure 12).

KE1 does not explicitly disclose focusing a laser on the tapered probe tip.

KE2 discloses focusing a laser on the tapered probe tip (Figure 8).

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include focusing a laser on the tapered probe tip as taught by KE2 in order to ensure that the part of the probe closest to the surface below it is sufficiently heated.

As to Claim 11,

KE1 does not disclose modulating the laser power that heats up the probe tip.

KE2 discloses modulating the laser power that heats up the probe tip (Column 17, Lines 60-64).

It would have been obvious to a person of ordinary skill in the art to modify KE1 to include modulating the laser power that heats up the probe tip as taught by KE2 in order to improve the magnetic sensitivity of the probe tip.

As to Claim 12,

KE1 discloses providing a two-conductor electrode (99) to the probe tip (80) ((Figure 14) and (Column 22, Lines 49-51)).

As to Claim 14,

KE1 discloses a magnetic coating (99) on the tip of the probe (Column 22, Lines 49-52).

In the rejection of Claim 1, heating a probe including a material having temperature-dependent magnetic properties was taught. It was not disclosed that the magnetic coating on the tip was heated from within a core of the probe. However, it would be a rearrangement of parts to use the disclosed laser to heat the magnetic coating from inside or outside the probe (2144.04). A person of ordinary skill in the art would be motivated to place the laser inside the probe to heat the magnetic coating from the inside in order to save space and reduce the size of the probe.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. (6,101,164) Embodiment One (KE1) in view of Kado et al. (6,101,164) Embodiment Two (KE2) and in further view of Gottschalk (6,573,817).

KE1 in view of KE2 discloses as explained above.

KE1 in view of KE2 does not disclose the ferromagnetic or paramagnetic material has a low Curie temperature.

Gottschalk discloses the ferromagnetic material has a low Curie temperature (Column 3, Lines 34-38).

It would have been obvious to a person of ordinary skill in the art to modify KE1

in view of KE2 to include the ferromagnetic material has a low Curie temperature as taught by Gottschalk in order to improve the magnetic sensitivity of the ferromagnetic material.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. (6,101,164) Embodiment One (KE1) in view of Kado et al. (6,101,164) Embodiment Two (KE2) and in further view of Farina et al. (5,856,880).

KE1 in view of KE2 discloses as explained above.

KE1 in view of KE2 does not disclose oscillating the temperature of the probe over a range of values having a lower limit below a compensation temperature of the probe material and an upper limit above the compensation temperature.

Farina et al. discloses oscillating the temperature of the material over a range of values having a lower limit below a compensation temperature of the material and an upper limit above the compensation temperature (Column 6, Lines 48-56).

It would have been obvious to a person of ordinary skill in the art to modify KE1 in view of KE2 to include oscillating the temperature of the probe over a range of values having a lower limit below a compensation temperature of the probe material and an upper limit above the compensation temperature given the above disclosure and teaching of Farina et al. in order to increase functionality by selectively controlling the magnetic sensitivity of the probe.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. (6,101,164) Embodiment One (KE1) in view of Kado et al. (6,101,164) Embodiment Two (KE2) and in further view of McCulloch et a. (5,031,126).

KE1 in view of KE2 discloses as explained above.

KE1 in view of KE2 does not disclose coupling a current source to the probe, and applying a current to the probe.

McCulloch et al. discloses coupling a current source to the probe, and applying a current to the probe (Column 7, Lines 51-54).

It would have been obvious to a person of ordinary skill in the art to modify KE1 in view of KE2 to include coupling a current source to the probe, and applying a current to the probe as taught by McCulloch et al. in order to improve the magnetic sensitivity of the probe.

9. Claim 15, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. (6,101,164) Embodiment One (KE1) in view of Kado et al. (6,101,164) Embodiment Two (KE2) and in further view of Michaels (4,968,314).

As to Claim 15,

KE1 in view of KE2 discloses as explained above.

KE1 in view of KE2 does not disclose the probe includes a transparent material coated with a heat-conducting material.

Michaels discloses the probe includes a transparent material (optical fiber)

coated with a heat-conducting material ((Column 1, Lines 17-19) and (Column 1, Lines 49-57)).

It would have been obvious to a person of ordinary skill in the art to modify KE1 in view of KE2 to include the probe includes a transparent material coated with a heat-conducting material in order to utilize the optical fiber to heat the heat-conducing material from the inside in order to save space and reduce the size of the probe.

As to Claim 16,

KE1 in view of KE2 do not disclose the probe includes an optical fiber pulled to form a probe.

Michaels discloses a metal end cap fitted over the tip of an optical fiber (Column 1, Lines 49-50).

It would have been obvious to a person of ordinary skill in the art to modify KE1 in view of KE2 to include the probe includes an optical fiber pulled to form a probe given the above disclosure and teaching of Michaels in order to utilize the optical fiber to heat the heat-conducing material from the inside in order to save space and reduce the size of the probe.

As to Claim 17,

KE1 in view of KE2 do not disclose the step of heating the core of the probe includes focusing a laser through the core of the probe

Michaels discloses a metal end cap fitted over the tip of an optical fiber (Column 1, Lines 49-50).

It would have been obvious to a person of ordinary skill in the art to modify KE1 in view of KE2 to include the step of heating the core of the probe includes focusing a laser through the core of the probe give the above disclosure and teaching of Michaels in order to place the laser inside the probe to heat the magnetic coating from the inside in order to save space and reduce the size of the probe.

10. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura (6,504,365) in view of Kado et al. (6,101,164) and Gottschalk (6,573,817).

As to Claim 18,

Kitamura discloses a cantilever adapted for oscillating (Column 4, Lines 13-18), wherein the cantilever has a first end and a second end (Figure 2), a probe coupled to the second end of the cantilever (Figure 2), a laser adapted for illuminating the second end of the cantilever (Figure 2), and an optical detector adapted for detecting light reflected by the cantilever (Figure 2).

Kitamura does not disclose a heat source adapted for heating the probe, and wherein the probe has a tip including a low Curie temperature material.

Kado et al. discloses a heat source (Laser) adapted for heating the probe (Column 17, Lines 60-64), and a probe tip including a ferromagnetic material ((Column 22, Lines 48-52) and (Figure 14)).

It would have been obvious to a person of ordinary skill in the art to modify Kitamura to include a heat source adapted for heating the probe and a probe tip

including a ferromagnetic material as taught by Kado et al. in order to improve the magnetic sensitivity of the probe and to extend the life of the probe (see Column 6, Lines 32-39 for information regarding extending the life of the probe).

Gottschalk discloses the ferromagnetic material has a low Curie temperature (Column 3, Lines 34-38).

It would have been obvious to a person of ordinary skill in the art to modify Kitamura to include the probe has a tip including a low Curie temperature material given the above disclosure and teaching of Gottschalk in order to improve the magnetic sensitivity of the ferromagnetic material.

As to Claim 19,

Kitamura does not disclose the heat source is a time-varying heat source adapted to modulate heat to the probe.

Kado et al. discloses the heat source is a time-varying heat source (Laser) adapted to modulate heat to the probe (Column 17, Lines 60-64).

It would have been obvious to a person of ordinary skill in the art to modify Kitamura to include the heat source is a time-varying heat source adapted to modulate heat to the probe as taught by Kado et al. in order to use a laser to heat the probe.

11. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura (6,504,365) in view of Kado et al. (6,101,164).

As to Claim 20,

Kitamura discloses a cantilever adapted for oscillating (Column 4, Lines 13-18), the cantilever having a first end and a second end (Figure 2), a probe coupled to the second end of the cantilever (Figure 2), the probe having a tapered tip (Figure 2), and a motion detector adapted for detecting a deflection of the cantilever ((Figure 2) and (Column 4, Lines 13-18)).

Kitamura does not disclose the tip including a ferrimagnetic material and a heat source adapted for heating the probe.

Kado et al. discloses the use of a ferrimagnetic material (Dy-Fe) (Column 23, Lines 27-30), and a heat source (Laser) adapted for heating the probe (Column 17, Lines 60-64).

It would have been obvious to a person of ordinary skill in the art to modify Kitamura to include the tip including a ferrimagnetic material and a heat source adapted for heating the probe given the above disclosure and teaching of Kado et al. in order to secure stable operation for a long time and to increase the magnetic sensitivity of the probe (see Column 23, Lines 30-32 for information regarding securing stable operation for a long time)).

As to Claim 21,

Kitamura does not disclose the heat source is a time-varying heat source adapted to modulate heat to the probe.

Kado et al. discloses the heat source is a time-varying heat source (Laser) adapted to modulate heat to the probe (Column 17, Lines 60-64).

It would have been obvious to a person of ordinary skill in the art to modify Kitamura to include the heat source is a time-varying heat source adapted to modulate heat to the probe as taught by Kado et al. in order to use a laser to heat the probe.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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